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PROVISIONAL SPECIFICATION

Improvements in Couplings for Rubber, Fabric and like Hoses

We, TECALEMIT LIMITED and CAMILLE CLARE SPRANKLING LE CLAIR, British Company and British Subject respectively, both of the Company's Works, at
5 Great West Road, Brentford, Middlesex, do hereby declare the nature of this invention to be as follows:—

This invention relates to couplings, adapters or like devices (hereinafter called "couplings") of the kind which comprise a ferrule at one end, adapted to be attached to a hose of rubber, fabric or other flexible and relatively compressible material, and means, such as a screwed
10 shank, whereby the coupling may be attached to another coupling, adapter or other device or apparatus.

Many methods of attaching such hoses to couplings are known, such, for
20 example, as that in which the hose is first passed as a fairly tight sliding fit over a tubular ferrule and is then clipped to the ferrule by one or more circumferential clips tightened by tangent screws. Such
25 means, however, are objectionable, in that the tightening screws are clumsy and essentially asymmetrically disposed so that they constitute projections from the circular form of the coupling which may be
30 a danger to the users' hands. Further, such clips are liable to break and to be lost.

The object of this invention, therefore, is to provide improved couplings and
35 improved methods for attaching couplings to hoses.

According to the present invention, a hose coupling is characterised by the feature that it is made in at least two
40 parts, one of which consists of an outer ferrule and the other of an inner ferrule (which forms the fluid flow conduit) which are so disposed in the completed coupling as to provide between them and
45 over part of their length an annular recess in which the end of the hose is fitted, both ferrules being formed with a number of grooves, recesses or indentations into which the material of the hose can be
50 forced in order that the hose shall be firmly gripped in the coupling. As an alternative, however, both ferrules may be

formed with a number of spaced protuberances adapted to be forced into the material of the hose.

The two ferrules are made separately and are assembled to form the coupling, cooperating means being provided on or in the ferrules whereby the inner ferrule can not only be fixed firmly within the outer
60 ferrule, but after assembly can also be locked in position.

The outer ferrule may, for example, consist of a sleeve part integral with an end part which is screwed internally to receive an externally threaded intermediate part of the inner ferrule, these two parts providing the inner closed end of the said annular recess which is formed between the outer and inner ferrule. A
70 portion of the inner ferrule within the outer ferrule may also be formed externally with serrations or indentations into which the metal of the outer ferrule may be forced after the ferrules have been
75 assembled so as to lock the ferrules together. The walls of the ferrules bounding the said recess may be formed with spaced longitudinal, or circular projections or with continuous or interrupted
80 screw thread-like projections or with projections of other forms adapted to be forced into the hose material when the outer ferrule is pressed inwards towards the inner ferrule. On the other hand,
85 both ferrules may be provided with a number of similar grooves, recesses or indentations.

In one construction, the metal inner ferrule, which has an axial bore providing the fluid flow conduit, is formed at one end with an externally screwed shank whereby the coupling may be attached to a hose or to another device or apparatus. The inner ferrule is also formed with an
90 intermediate part, which is screwed externally and is separated from the shank by means of a circular shoulder. At the end of this intermediate part remote from the shoulder there is a short cylindrical
95 portion which is knurled externally and is of diameter equal to or slightly less than the bottom of the thread on the intermediate part. The remainder of the inner
100

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ferrule forms a spigot which is of less diameter than the said knurled portion and its tip is rounded to facilitate the easy entry of the spigot into the hose. The

5 spigot is also formed externally with a number of spaced circumferential rings or ridges and the inner end of the spigot is radiused to meet the said knurled portion.

The metal outer ferrule is hollow and 10 over the greater part of its length it is formed as a relatively thin sleeve which is screw-threaded internally and is integral with an end part which is formed externally with flats so that it may act as 15 a nut and receive a spanner. This end part is screw-threaded internally to receive the external thread on the said intermediate part of the inner ferrule and it is of such a length that when the ferrules are assembled, a part of the thread 20 surrounds the said knurled part of the inner ferrule.

In assembling the two ferrules, the inner ferrule is screwed into the outer 25 ferrule until the said shoulder on the inner ferrule abuts against the face of the nut portion of the outer ferrule. When the ferrules are thus assembled, the tip of the spigot part of the inner ferrule projects 30 slightly out of the sleeve part of the outer ferrule. The end of the hose is engaged over the tip of the spigot part of the inner ferrule and is then pushed over the spigot part into the annular space between the 35 ferrules.

The sleeve part of the outer ferrule is then swaged inwards, e.g., by means of split dies or a roller device. This swaging operation not only crushes the thread 40 on the sleeve part of the outer ferrule into the material of the hose and also crushes the hose on to the rings or ridges on the spigot part of the inner ferrule, but it also crushes the tops of the threads in the threaded end part of the outer ferrule into 45 the serrations of the knurled part of the inner ferrule and thus provides a lock to prevent the two ferrules becoming unscrewed.

The circular rings or ridges on the 50 inner ferrule may be replaced by one or more helical screw threads and the internal protuberances in the sleeve part of the outer ferrule may be in the form of separate circular rings or ridges instead 55 of the helical thread referred to above.

The knurled part of the inner ferrule may also be formed adjacent to the said shoulder, the metal of the outer ferrule then being swaged into the knurled part 60 of the inner ferrule, if necessary by a separate swaging operation.

Dated this 1st day of January, 1945.

Agents for the Applicants,
STANLEY, POPPLEWELL &
FRANCIS,

Chartered Patent Agents,
Jessel Chambers,

88/90, Chancery Lane, London, W.C.2.

COMPLETE SPECIFICATION

Improvements in Couplings for Rubber, Fabric and like Hoses

We, TECALEMIT LIMITED and CAMILLE CLARE SPRANKLING LE CLAIR, British 65 Company and British Subject respectively, both of the Company's Works, at Great West Road, Brentford, Middlesex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described 70 and ascertained in and by the following statement:—

This invention relates to couplings, adapters or the like devices (hereinafter 75 called "couplings") which comprise a ferrule at one end, adapted to be attached to a hose of rubber, fabric or other flexible and relatively compressible material, and means, such as screwed shank, whereby 80 the coupling may be attached to another coupling, adapter or other device or apparatus.

The invention relates more particularly to couplings of the kind made in at least 85 two parts, one of which consists of an outer ferrule and another of an inner fer-

rule (which forms the fluid flow conduit) which ferrules are so disposed in the completed coupling so as to provide between them and over part of their length an 90 annular recess in which the end of the hose is fitted, each ferrule being formed either with a recessed portion or portions into which the material of the hose can be forced or with a protuberance or protuberances adapted to be forced into the 95 material of the hose, so that in either case the hose may be firmly gripped in the coupling.

The object of this invention is to provide 100 improved couplings of the kind referred to and improved methods for attaching such couplings to hoses.

According to the present invention there is provided a hose coupling of the 105 kind referred to wherein the inner ferrule is screwed into the outer ferrule to assemble the coupling, and wherein a portion of the inner ferrule is formed externally with indentations into which, after 110

assembly of the coupling, the metal of the outer ferrule is forced by external radial pressure applied to the outer ferrule, so as to lock the ferrules against relative unscrewing.

The outer ferrule may, for example, comprise a sleeve part integral with an end part which is screwed internally to receive an externally threaded intermediate part of the inner ferrule, these two latter parts providing the inner closed end of the said annular recess which is formed between the outer and inner ferrules.

One constructional form of the invention is shown, by way of example, on the accompanying sheet of drawings, whereon:—

Fig. 1 is a longitudinal section of the hose coupling;

Fig. 2 is an end view of the coupling; and

Fig. 3 is a fragmentary sectional view to an enlarged scale of the coupling showing the protruding ridges or rings on the inner ferrule and outer ferrule.

Referring to the drawings:—

The metal inner ferrule 1, which has an axial bore 2 providing the fluid flow conduit, is formed at one end with an externally screwed shank 3 whereby the coupling may be attached to a hose or to another device or apparatus (not shown). The inner ferrule 1 is also formed with an intermediate part 4 which is screwed externally and is separated from the shank by means of a circular shoulder 5. At the end of this intermediate part remote from the shoulder there is a short cylindrical portion 6 which is knurled externally and is of diameter equal to or slightly less than the bottom of the thread on the intermediate part 4. The remainder of the inner ferrule forms a spigot 7 which is of less diameter than the said knurled portion 6 and its tip 8 is rounded to facilitate the easy entry of the spigot into the hose. The spigot is also formed externally with a number of spaced circumferential rings or ridges 9 and the inner end of the spigot is radiused at 10 to meet the said knurled portion.

The metal outer ferrule 11 is hollow and over the greater part of its length it is formed as a relatively thin sleeve 12 which is helically serrated internally at 13 and is integral with an end part 14 which is formed externally with flats so that it may act as a nut and receive a spanner. This end part is screw-threaded internally to receive the external thread on the intermediate part 4 of the inner ferrule and it is of such a length that when the ferrules are assembled, a part of the thread surrounds the knurled part 6 of

the inner ferrule.

In assembling the two ferrules, the inner ferrule 1 is screwed into the outer ferrule 11 until the shoulder 5 on the inner ferrule abuts against the face of the nut portion 14 of the outer ferrule. When the ferrules are thus assembled, the tip 8 of the spigot part 7 of the inner ferrule projects slightly out of the sleeve part 12 of the outer ferrule. The end of the hose is engaged over the tip of the spigot part of the inner ferrule and is then pushed over the spigot part right home to the bottom of the annular space between the ferrules.

The sleeve part 12 of the outer ferrule is then swaged inwards, e.g., by means of split dies or a roller device. This swaging operation not only crushes the serrations in the sleeve part 12 of the outer ferrule into the material of the hose thereby also crushing the hose on to the rings or ridges 9 on the spigot part 7 of the inner ferrule, but it also crushes the tops of those threads in the threaded end part of the outer ferrule which surround the knurled part 6 of the inner ferrule into the serrations of the knurled part and provides a lock to prevent the two ferrules becoming unscrewed.

The separate circular rings or ridges 9 on the inner ferrule may, if desired, be replaced by one or more helical serrations and correspondingly the internal helical protuberances in the sleeve part of the outer ferrule may be replaced by separate circular rings or ridges, like the rings or ridges 9.

In a modification the knurled part 6 of the inner ferrule may also be formed adjacent to the said shoulder 5, the metal of the outer ferrule then being swaged into the knurled part of the inner ferrule, if necessary by a separate swaging operation.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A hose coupling of the kind referred to wherein the inner ferrule is screwed into the outer ferrule to assemble the coupling, and wherein a portion of the inner ferrule is formed externally with indentations into which, after assembly of the coupling, the metal of the outer ferrule is forced by external radial pressure applied to the outer ferrule, so as to lock the ferrules against relative unscrewing.

2. A hose coupling as claimed in Claim 1, wherein the outer ferrule comprises a sleeve part integral with an end part which is screwed internally to receive an externally threaded intermediate part of

the inner ferrule, these two latter parts providing the inner closed end of the said annular recess which is formed between the outer and inner ferrules.

5 3. A hose coupling as claimed in Claim 2 wherein the external indentations on the inner ferrule are in the form of knurling disposed adjacent to the externally threaded intermediate portion of the inner ferrule within the internally-threaded end 10 part of the outer ferrule, and the knurled portion of the inner ferrule is of a diameter equal to or slightly less than the internal diameter of the said internally threaded end-part of the outer ferrule.

15 4. A hose coupling as claimed in any of the preceding Claims, wherein the outer end or tip of the inner ferrule is slightly rounded to facilitate the entry of the ferrule into the hose.

20 5. A hose coupling, which comprises, in combination, a hollow outer ferrule including a relatively thin sleeve portion and an integral end part which is screw threaded internally, a hollow inner ferrule 25 which provides the fluid flow conduit and comprises a spigot part, an integral intermediate part which is screw-threaded externally and an integral shank part 30 which is adapted to be connected to a device or apparatus or another hose, the two ferrules being assembled in coaxial relationship by entering the said spigot part of the inner ferrule into the sleeve 35 part of the outer ferrule and screwing the externally threaded intermediate part of

the inner ferrule into the internally threaded end part of the outer ferrule, a cylindrical knurled portion being formed adjacent to the externally threaded intermediate part of the inner ferrule and positioned to fall within the internally threaded portion of the outer ferrule, the inner wall of the said sleeve part of the outer ferrule and the outer wall of the said spigot part of the inner ferrule being formed with a groove, recess or indentation or with a number of grooves, recesses or indentations, into or on to which the material of the hose which is fitted in the annular recess between the said spigot part and the said sleeve part can be forced by external radial pressure applied to the sleeve part, which pressure or additional pressure acts to force the metal of the said end part of the outer ferrule into the serrations of the said knurled portion of the inner ferrule to lock the ferrules against relative unscrewing. 40 45 50 55 60

6. A hose coupling of the kind referred to, substantially as described with reference to the accompanying drawings.

Dated this 4th day of December, 1945.

Agents for the Applicants,
STANLEY, POPPLEWELL &
FRANCIS,

Chartered Patent Agents,
Jessel Chambers,

88/90, Chancery Lane, London, W.C.2.

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